What is claimed is:

1. A multi-layer class identifying communication apparatus, comprising:

an input interface connected to input communication lines;

a switch circuit; and

an output interface connected to output communication lines,

wherein said input interface comprises an allocating section which determines a class identifier indicative of one of classes to which an IP packet belongs, from header data of said IP packet received through one of said input communication lines, and allocates an IP-QOS (Internet-Protocol-Quality-of-Service) code to said IP packet, and

wherein said switch circuit selects one of said output communication lines based on a destination address of said IP packet, such that said IP packet is outputted from said output interface to said selected output communication output interface.

2. The multi-layer class identifying communication apparatus according to claim 1, wherein said allocating section specifies a priority traffic based on an optional combination of said IP header and values of a plurality of fields of a TCP header.

3. The multi-layer class identifying communication apparatus according to claim 1, further comprising a scheduler controls said switch circuit for a scheduling operation to said IP packet, wherein said scheduler can carry out WRR (Weighted Round Robin Scheduling) method and a fixed priority scheduling method as a class scheduling method, and can select said fixed priority scheduling method for said IP packet of said class based on said class identifier.

4. The multi-layer class identifying communication apparatus according to claim 3, wherein said scheduler controls said switch circuit based on said IP-QOS code.

5. The multi-layer class identifying communication apparatus according to claim 1, further comprising a queue managing section which manages a queue such that a plurality of IP packets can be shared in units of said IP-QOS codes.

6. The multi-layer class identifying communication apparatus according to claim 1, wherein each of said input interface and said output interface monitors traffic in units of said IP-QOS codes to restrict excessive traffic.

7. The multi-layer class identifying communication apparatus according to claim 1, wherein said class identifier includes three kinds of service class of an EF (Expedited Forwarding (Premium service)) class, an AF (Assured Forwarding Service) class, and a BE (Best Effort Service) class.

8. The multi-layer class identifying communication apparatus according to claim 1, wherein said input interface comprises:

an IP packet receiving section which extracts said header data and TCP header data of said IP packet;

a class identifier memory;

an IP-QOS class determining section which refers to said class identifier memory to determine said class identifier, using said header data of said IP packet as a search key;

a reception side control section which carries out a priority control to said IP packet that a destination has been specified, based on said IP-QOS code and IP packet data of said IP packet; and

a reception side switch interface which carries out said priority control and issues a transmission request to said output interface in units of said class identifiers, and

wherein said IP-QOS class determining section

monitors a coming traffic which exceeds a transmission permissive capacity which is set for every IP-QOS class, carries out a discarding operation of IP packets of said coming traffic or a policing operation to lower transmission priorities of said IP packets of said coming traffic, when said coming traffic exceeds said transmission permissive.

9. The multi-layer class identifying communication apparatus according to claim 1, wherein said output interface comprises:

a payload memory;

a FIFO memory;

a transmission side switch interface which receives said IP packet from said input interface to store in said payload memory, and generates IP packet data to write in said FIFO memory;

IP-QOS class scheduler which carries out a scheduling function and a queuing operation based on IP-QOS class code to primarily issue a transmission request such that said IP packet is transmitted with a priority;

a transmitting section which transmits said IP packet transferred from said input interface to a data link layer and a network access layer; and

a transmission side control section which control said transmitting section based on said

priority.

10. The multi-layer class identifying communication apparatus according to claim 9, wherein said scheduling function is based on WRR (weighted round robin) method.

11. A method of controlling a transmission of an IP packet flow, comprising:

determining a class identifier indicative of one of classes to which an IP packet belongs, from header data of said IP packet received through one of input communication lines;

allocating an IP-QOS (Internet-Protocol-Quality-of-Service) code to said IP packet; and

selecting one of output communication lines based on a destination address of said IP packet, such that said IP packet is outputted from said output interface to said selected output communication output interface.

12. The method according to claim 11, wherein said allocating includes:

specifying a priority traffic based on an optional combination of said IP header and values of a plurality of fields of a TCP header.

13. The method according to claim 11, further comprising scheduling transfer of said IP packet using one of a WRR (Weighted Round Robin Scheduling) method and a fixed priority scheduling method.

14. The method according to claim 13, wherein said scheduling is carried out based on said IP-QOS code.

15. The method according to claim 11, further comprising managing a queue such that a plurality of IP packets can be shared in units of said IP-QOS codes.

16. The method according to claim 11, further comprising monitoring traffic in units of said IP-QOS codes to restrict excessive traffic.

17. The method according to claim 11, wherein said class identifier includes three kinds of service class of an EF (Expedited Forwarding (Premium service)) class, an AF (Assured Forwarding Service) class, and a BE (Best Effort Service) class.

18. The method according to claim 11, wherein said determining includes:

extracting said header data and TCP header

data of said IP packet;

referring to a class identifier memory to determine said class identifier, using said header data of said IP packet as a search key;

carrying out a priority control to said IP packet in which a destination has been specified, based on said IP-QOS code and IP packet data of said IP packet; and

transferring said IP packet in units of said class identifiers.

19. The method according to claim 11, further comprising:

monitoring a coming traffic which exceeds a transmission permissive capacity which is set for every IP-QOS class; and

carrying out a discarding operation of IP packets of said coming traffic or a policing operation to lower transmission priorities of said IP packets of said coming traffic, when said coming traffic exceeds said transmission permissive.

20. The method according to claim 11, wherein said selecting includes:

carrying out a scheduling function and a queuing operation to said IP packet based on IP-QOS class code such that said IP packet is transmitted

with a priority; and

transmitting said IP packet transferred from said input interface to a data link layer and a network access layer based on said priority.

21. The method according to claim 20, wherein said scheduling function is based on WRR (weighted round robin) method.